CHAPTER VIII

CONCLUSION AND FURTHER WORK

8.1 CONCLUSION

In this thesis, we simulate various scenarios to understand the effect of interference mitigation methods, and non-orthogonal multiple access on user and cell throughput.

In the first part of thesis, we start evaluating the performance of proportional Fair scheduling algorithms and compare with proposed PF scheduling algorithm; Modified proportional fair is concerning on near outdoor UEs which may have lower signal to interference ratio. We state some improvements

We investigate using eICIC method named Almost Blank Subframe (ABS) which was explained in previous chapter and show how ABS affects user throughput.

In second part of thesis, we introduce non orthogonal multiple access which utilizes additional new domain named power domain, we compare user throughput when using orthogonal multiple access (OMA) and NOMA in macro-femto Network. We also consider imperfect interference cancellation to evaluate its effect in throughput.

In third Part, we propose user selection with fixed power allocation scheme for NOMA downlink in heterogeneous network (USPA), compare with FPA scheme, and show throughput of users.

Finally, we use Joint transmission as COMP techniques with Non orthogonal multiple access in heterogeneous network to improve average user throughput and cell throughput

8.2 FURTHER WORK

There are several steps for further research, first, named future radio access (FRA) in the 2020s, further enhancement to achieve significant gains in capacity and system throughput performance is a high priority requirement in view of the recent exponential increase in the volume of mobile traffic, e.g., beyond a 500 fold increase in the next decade [57], and the need for enhanced delay-sensitive high-volume services such as video streaming and cloud computing. Thus, the 3GPP recently has initiated discussions on further evolution of LTE towards the future, i.e., Release 12 and onwards. In order to continue to ensure the sustainability of 3GPP radio access technologies over the coming decade, new solutions must be identified and provided that can respond to future challenges [43].

Second, to accommodate such demands, a combination of multiple approaches, i.e., technologies for spectrum efficiency enhancement, spectrum extension with efficient use of higher frequency bands, and network densification deploying small cells would be required. In this sense, innovative radio access technologies to enhance significantly the spectrum efficiency and the small-cell enhancement now on-going in the 3GPP are very important [58]. Although it may be very challenging, our target for FRA toward the 2020s is to achieve a further 3-fold enhancement in the spectrum efficiency compared to the LTE baseline. Since LTE has already achieved a 3-4 fold enhancement in the spectrum efficiency compared to 3G High- Speed Packet Access (HSPA), our target gain would be more than fold compared to the 3G HSPA. Thus, for instance, the gain in the total capacity such as beyond 500 fold can be achieved if other ways, i.e., spectrum extension and network densification achieve a capacity gain of 50 fold.

Third, Energy efficiency (EE), defined as the amount of energy required to transfer one byte of data, was identified as a key 5G requirement in [59], but until now little research has been devoted to UE EE. Current 5G projects such as METIS and 5G are following a clean slate approach to RAT design, and since EE is a significant design motivation for 5G it justifies a novel disruptive design. Conversely backwards compatibility requirements prohibit substantial changes to standards like Long Term Evolution (LTE), which is partly in a deadlock with several releases, providing limited EE improvements. For instance the LTE release 11 Enhanced Physical Downlink Control Channel (EPDCCH) even has a negative effect on EE.